



# 3.9 B

people at risk



About

# 390 M

infections  
per year

Endemic  
in **129**  
countries around  
the world

# DENGUE

## Forging global partnerships to tackle a rapidly spreading climate-sensitive disease

The World Health Organization classifies dengue as one of the **top 10 threats to global health**. Caused by a virus that is spread by the bite of the Aedes mosquito, dengue symptoms can include fever, nausea, vomiting, rashes, fatigue, and intense eye, muscle, joint, and bone pain. For some, dengue infection can be severe, causing plasma leakage – a serious complication that can result in shock, organ dysfunction, bleeding, and death. Pregnant women, the elderly, and people with comorbidities are particularly vulnerable to severe dengue. Repeated infection increases the risk of developing severe disease.

Dengue is the most widely distributed viral disease in the world, and it is **spreading rapidly due to climate change**, urbanization, and population growth. By some estimates, 60% of the world's population will be at risk by 2080. Hospitals in some endemic countries are frequently overwhelmed by the number of patients requiring intensive, round-the-clock monitoring and supportive care during outbreaks. With the disease spreading rapidly, there is no specific treatment or cure for dengue. Medicines that can treat the disease – and prevent mild cases from becoming severe – are urgently needed.

## The push for progress

In 2022, we established **the Dengue Alliance, a truly global partnership of leading public health institutes in endemic countries**. Together, we are working to complement vaccine and vector control strategies by identifying antivirals or host-directed therapies that are effective against the disease.

**Our goal is now** to accelerate innovation for dengue by delivering an affordable and accessible dengue treatment solution, complete our assessment of the dengue burden in Africa, and identify biomarkers that can accurately predict progression to severe dengue.

## Partnering for progress through the Dengue Alliance

The Dengue Alliance, launched in 2022, is a global partnership led by Siriraj Hospital, Mahidol University, Thailand; the Translational Health Science and Technology Institute of India; Oswaldo Cruz Foundation, Brazil; Federal University of Minas Gerais, Brazil; Institute of Medical Research of the Ministry of Health, Malaysia; and DNDi.

The Alliance is working to develop affordable and accessible treatments for dengue by progressing pre-clinical investigations of potential dengue

“ I knew there was no treatment for dengue, and I knew it could be deadly. That scared me. Dengue shouldn't be neglected because it can happen to anyone... at any time.

**Ploypilin** and her family live in Khlong Toey, Bangkok, Thailand. Her two daughters both fell ill with dengue and were hospitalized, which is common for kids with dengue as close monitoring is critical. Ploypilin's daughters are well now – but everyone fears a second infection, which can be much more dangerous.



Photo credit: Luke Duggleby-DNDi

treatments, testing the efficacy of repurposed drugs, and implementing clinical trials of the most promising drug candidates.

Alliance members are also coordinating efforts to help overcome knowledge gaps to expedite clinical research and regulatory approvals, including addressing unmet needs in dengue diagnosis and testing.

In 2022, the **Dengue Alliance completed pre-clinical profiling of 23 compounds**, yielding a shortlist of three compounds that will proceed to further pre-clinical studies in 2023. The pre-clinical profiling was achieved entirely through the in-kind contribution of Alliance members – a strong show of South-South cooperation and of leadership and commitment from countries most impacted by the disease.

## A first-of-its-kind epidemiological study in Africa

While the dengue vector, the *Aedes* mosquito, is widespread in Africa, and outbreaks have been reported in several countries, **the burden of disease on the continent is unclear**. While population-based studies have yielded valuable data in Asia and the Americas, few studies have been conducted in African countries.

DNDi, Imperial College London, and our research partners in Africa initiated **a large epidemiological study in Ghana, the DRC, and Senegal** in 2022 to determine the age-specific and overall seroprevalence of dengue as a measure of disease burden, leveraging bio-bank samples from recent Sars-COV-2 surveys.

The study is also designed to determine the seroprevalence of five other arboviruses and to evaluate the performance of different assays on multiple pathogens of public health importance in Africa. Data gathered will be used to update existing estimates of the global burden and estimate the impact of implementing vaccination programmes in conjunction with vector control and treatment-based approaches.

## Using the power of AI to accelerate drug discovery

In 2022, DNDi partnered with BenevolentAI to identify potential biological targets and therapies that can be repurposed to prevent mild cases of dengue from progressing to severe disease. The project combined the Benevolent Platform™ with DNDi's expertise and global network of dengue partners to empower researchers to uncover insights they would not have been able to find using human reasoning alone. **Using AI tools, researchers are interrogating the underlying mechanisms involved in dengue, better framing hypotheses, and rapidly identifying targets or therapies** that could be repurposed to prevent disease progression.

In a non-commercial collaboration with DNDi, BenevolentAI screened dozens of drug candidates using its bespoke workflow for repurposing existing treatments. The workflow, developed during the COVID-19 pandemic, yielded **15 candidates that were further narrowed down to a shortlist of five potential treatments** that are moving forward to pre-clinical studies in 2023.